STRUCTURED BRAINSTORMING

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1. Introduction

Many if not most organizations regularly form ad hoc groups to brainstorm (to think creatively) about important problems such as formulating a strategy, solving a problem, designing a process, improving a process, conducting risk analysis, and defining the tasks for a project (i.e., work breakdown structure). Alex Osborn (the “O” in the BBDO advertising firm) is often credited with being one of the first to promote brainstorming (Osborn, 1948). His most important rule was to avoid criticism, negative feedback, and debate. He argued that:

"Creativity is so delicate a flower that praise tends to make it bloom while discouragement often nips it in the bud."

He went on to state:

"Forget quality. Aim now to get a quantity of answers. When you’re through, your sheet of paper may be so full of ridiculous nonsense that you’ll be disgusted. Never mind. You’re loosening up your unfettered imagination – making your mind deliver."

However, in most organizations, unstructured brainstorming is characterized by unequal participation (a few people talking and many people silent), wandering topics (often changing with every speaker), and no documentation (except for a few notes scribbled on the whiteboard). As a result, these meetings often end with no clarity, no shared understanding, no agreement, no consensus, no sense of ownership, and no action plan. People leave these meetings frustrated and the organization cannot point to any tangible benefits from the brainstorming session.

Many different approaches to structured brainstorming have been developed through the years, but the best-known formal methods are the Nominal Group Technique (NGT) and the Delphi Method. NGT was developed by Van de Ven and Delbecq (1971, 1974, 1975) and is considered by most
experts to be the best structured brainstorming method for problem solving.¹ Bryson (1995) and many others have proposed brainstorming methods based on NGT. This paper also presents a methodology for structured brainstorming that is motivated by the NGT.

According to Rescher (1998), the Delphi Method was developed as a part of the RAND project during the 1950s and 1960s by Helmer, Dalkey, and Rescher. Delphi is most appropriate for using expert opinions to forecast future events, particularly the development of new technologies (Moore 1987). This paper will focus exclusively on NGT-like methods because they are the best brainstorming methods for most problem solving situations.

The remainder of this paper is organized as follows. Section 2 compares convergent and divergent thinking to provide a basis for understanding the power structured brainstorming. Section 3 compares structured brainstorming to typical brainstorming approaches, section 4 presents the steps for using structured brainstorming, section 5 presents some general guidelines for brainstorming, and section 6 concludes the paper. The appendix is a one-page handout that can be given to participants of a brainstorming group to offer a quick overview of structured brainstorming.

2. Convergent versus divergent thinking

According to Lehrer (2012), research has challenged many of Osborn’s foundational ideas on brainstorming. Lehrer states that “… there is a problem with brainstorming. It doesn’t work.” He summarizes research that shows that it is better to get individual ideas first and groups should challenge ideas to refine them. Without referencing NGT, Lehrer presents the basic concept of NGT, which leverage both divergent and convergent thinking.

A convergent task requires convergent thinking to solve a problem that has a “correct” answer. Convergent tasks usually have a well-defined goal that is widely shared. Therefore, with a convergent task, a group of people can work together to collect many facts and evaluate several alternatives to “converge” on the best (or nearly best) solution.

In contrast, a divergent task requires divergent thinking to find many possible solutions to a problem that does not have a single correct solution. Divergent tasks often have poorly defined goals and the goals may not be widely shared. Therefore, with a divergent task, it is often better to have individuals or small groups work independently to come up with many potential divergent solutions. The two figures above and the table below illustrate and explain the differences between convergent and divergent thinking.

¹ Author’s note:  This author learned how to use the NGT from Professor Andy Van De Ven, who is currently a professor in the Carlson School of Management at the University of Minnesota.
Structured brainstorming starts with individuals privately using divergent thinking to generate many independent ideas. NGT then has people share their independent ideas with the group, but still disallows discussion or criticism (i.e., disallows convergent thinking) until all of the ideas have been generated and shared. This process is supported by research by Woolley et al. (2010, p. 688) that found that “groups where a few people dominated the conversation were less collectively intelligent than those with a more equal distribution of conversational turn-taking.” Lastly, structured brainstorming uses convergent thinking to discuss, organize, and evaluate the ideas to get consensus and ownership. The next two sections explain structured brainstorming in more detail.

3. A comparison of structured and typical brainstorming methods

Typical brainstorming sessions are conducted informally with the facilitator posing a question, urging participants to not criticize any ideas, and then taking notes on the board as fast as ideas come from participants. Structured brainstorming has many advantages over this typical informal brainstorming, in that it:

- Starts with independent ideas from all participants, which leads to a high-quality final result.
- Shows respect for all participants and their ideas.
- Gives an opportunity for all participants to share by limiting high-verbal participants.
- Quickly collects many ideas, groups them, names each group, and then prioritizes the groups.
- Provides a shared visual and physical experience that engages all of the participants.
- Creates complete documentation of the participants’ ideas in their own words without anyone taking notes.

### Table 1. Comparison of convergent and divergent thinking

<table>
<thead>
<tr>
<th>Divergent task</th>
<th>Convergent task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem characteristics</td>
<td></td>
</tr>
<tr>
<td>Not well-defined</td>
<td>Well-defined</td>
</tr>
<tr>
<td>Poorly structured</td>
<td>Clearly structured</td>
</tr>
<tr>
<td>Highly complex</td>
<td>Minimally structured</td>
</tr>
<tr>
<td>Broad</td>
<td>Narrow</td>
</tr>
<tr>
<td>Goal/purpose</td>
<td></td>
</tr>
<tr>
<td>Seek to generate many potential solutions</td>
<td>Seek to find the one best solution</td>
</tr>
<tr>
<td>Step in the scientific method</td>
<td></td>
</tr>
<tr>
<td>Hypothesis generation</td>
<td>Hypothesis testing</td>
</tr>
<tr>
<td>Thinking required for this type of task</td>
<td></td>
</tr>
<tr>
<td>Creative</td>
<td>Critical</td>
</tr>
<tr>
<td>Unconstrained imagination building new connections</td>
<td>Focused analysis using information to evaluate</td>
</tr>
<tr>
<td>Product design examples</td>
<td></td>
</tr>
<tr>
<td>What new products might meet that customer need?</td>
<td>Which one of these five new products is best?</td>
</tr>
<tr>
<td>General examples</td>
<td></td>
</tr>
<tr>
<td>How solve world hunger?</td>
<td>What is the solution to this algebra problem?</td>
</tr>
<tr>
<td>How design a new house?</td>
<td>How do I put this jigsaw puzzle together?</td>
</tr>
<tr>
<td>How can we create a jigsaw puzzle?</td>
<td></td>
</tr>
</tbody>
</table>

Source: Professor Arthur V. Hill
Structured brainstorming

- Avoids conflict.
- Creates a shared understanding of the problems and/or solutions.
- Builds a strong sense of ownership of the final results.

Structured brainstorming has a few potential disadvantages. These include:

- The group might not reach a consensus and therefore not be committed to the results.
- Some high-verbal people might be frustrated that they cannot criticize ideas or jump to what they consider to be the obvious solution.
- Some participants rebel against the structure. More specifically, some participants are “non-compliant” with writing in large font, sharing only one idea at a time, and deferring criticism.\(^2\)
- The process sometimes require a skilled facilitator.
- The process does not work very well with large groups (i.e., over ten people).\(^3\)
- While 3M Super-Sticky Post-it Notes\(^{TM}\) are a great product, they are not cheap.

Most organizations find that the value of the structured brainstorming process far exceeds the cost. Many organizations find that once they use structured brainstorming a couple of times, it quickly becomes the standard operating procedure for identifying and solving problems, conducting risk analysis, identifying tasks for a project (i.e., work breakdown structure), etc. Many people find that once they have mastered structured brainstorming, they use a simplified form of it in almost every meeting.

4. Structured brainstorming

The core ideas of structured brainstorming are (1) silent generation of ideas (one idea per note), (2) round robin sharing of ideas (one at a time), (3) grouping like ideas and give them a name, and (4) multi-voting to prioritize groups for further action. The following specific steps were developed by this author:

- **Prepare** – Define the main question, select participants, arrange for a room with some empty walls, and acquire materials (a marking pen and about 20 lined 4x4 Super-sticky Post-it Notes\(^4\) for each participant).
- **Kickoff** – Write the main question on an easel or whiteboard at the front of the room.
- **Generate** – Give participants 5-10 minutes to silently respond to the main question by writing one idea per note. Instruct them to print no more than 2-3 words on each note in very large font so others can read it from across the room. Create an example and put it on the wall. Have participants put their pens down when they are finished. Move to the next step when most pens are down.

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\(^2\) This author once led a brainstorming session for a not-for-profit board that included the board chair of a Fortune 100 firm. He insisted on using his favorite light blue pen and in writing in very small font. The author was not successful in affecting behavior change.

\(^3\) This author has twice led a brainstorming sessions with over 50 people. It can be done, but requires lots of help.

\(^4\) Post-it Notes is a registered trademark of the 3M Company. Full disclosure: The author has worked as a consultant for 3M since about 1980.
Structured brainstorming

- **Share** – Have participants take turns adding one new note to the wall while explaining it – starting with their most important notes. They should add duplicates to the wall first. Try to create logical groups as you go. Allow others to ask for clarification, but do not allow criticism. Participants may pass and then add new notes later. In round three, have participants share all of their remaining notes on the wall.

- **Group** – Ask for 2-3 volunteers to come to the wall to organize the notes into groups. You may want to give other participants a short break during this time. Create a title Post-it Note for each group placed above the group. Identify title Post-it Notes with a box around the edges.

- **Rearrange** – Ask all participants to come to the wall to rearrange notes and groups. Skip this if short on time.

- **Multivote** – Ask all participants to come to the wall and vote for 3 groups. Do not allow participants to vote for a group more than once. Voting can be done with sticky dots or marks on the title notes.

- **Discuss** – Ask participants to summarize the results and identify next steps. Lastly, go around and ask each participant to briefly share their final thoughts.

- **Follow-up** – Conduct additional structured brainstorming sessions to create solutions, implementation plans, and/or risk mitigation plans. Delegate tasks and then hold people accountable.

The structured brainstorming is often just the starting point for formulating a strategy, solving a problem, designing a process, or improving a project. Ideally, the structured brainstorming session will identify and prioritize projects that can translate the ideas and goals into actions. During the brainstorming session, it is important to decide which projects to undertake, select an owner for each project, and identify the next steps. Projects can be of many types:

- **Just-Do-It projects** – These are very small projects that one person can do, require no formal tools, and can be done in a day.

- **Job description projects** – These are projects within the scope of someone’s job description, require very few (if any) tools, and usually require less than a month.

- **Kaizen workshops** – These are team projects that usually focus on processes inside a workgroup, use team members from the workgroup, use lean tools, and normally require less than a week.

- **DMAIC projects** – These are projects that focus on larger cross-departmental projects, use a cross-departmental project team, use the DMAIC\(^5\) approach for project management, use lean and Six Sigma tools, and normally require 1-6 months.

- **Strategic initiatives** – These are programs that require many DMAIC projects or Kaizen workshops over a long period of time, possibly several years.

Structured brainstorming is also a useful tool for defining specific steps needed for a project (i.e., the work breakdown structure), identifying risk factors that might threaten the success of a project or process, and developing a risk mitigation plan for the project or process.

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\(^5\) DMAIC stands for Define-Measure-Analyze-Improve-Control and is the standard framework used in most Lean Sigma programs. See Hill (2012) for more information on this project management/problem solving approach.
5. Some guidelines for brainstorming

Some guidelines for brainstorming.⁶

Do …
- Encourage people to be creative.
- Use imagination without evaluation or criticism.
- Make sure that participants are away from their day job and normal work pressures.
- Use ideas to stimulate further ideas.
- Understand that ideas are not owned by any one person.
- Engage everyone.
- Be playful to stimulate creativity.
- Share, support, and encourage.
- Use metaphors to think in new ways.
- Use other types of mental frameworks to generate new thinking.⁷

Don’t …
- Interrupt, evaluate, or criticize.
- Worry about being right or looking silly.
- Be a know-it-all.
- Say “we tried that already.”
- Use negative body language or disapproving expressions.

6. Conclusions

Brainstorming has been a popular tool for organizational improvement for decades. It is common for a group of people to get together to “brainstorm” (generate ideas, discuss, debate, and prioritize) answers to important questions. However, unstructured brainstorming is characterized by unequal participation (a few people talking and many people silent), wandering topics (often changing with every speaker), and no documentation (except for a few notes scribbled on the whiteboard). As a result, these meetings often end with no clarity, no shared understanding, no agreement, no consensus, no sense of ownership, and no action plan. When the meeting is over, people leave feeling frustrated and unproductive.

In contrast, structured brainstorming is an effective structured approach to brainstorming. It shows respect for all participants, controls “high-verbal” participants, quickly collects many ideas, efficiently groups, titles, and prioritizes ideas, provides a shared visual and physical experience that engages all of the participants, encourages consensus and a shared understanding of the problems and/or solutions, creates detailed documentation of the participants’ ideas in their own words, and builds a strong sense of ownership over the results.

⁶ Some of these are adapted from a whitepaper found at www.w-metrix.com.
⁷ For example, an effort to improve an MBA student experience might consider how medical schools prepare medical students to become doctors.
7. References


STRUCTURED BRAINSTORMING SUMMARY

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Structured brainstorming is a powerful approach for helping groups identify and solve problems. The benefits of structured brainstorming over commonly-used brainstorming and problem solving methods include:

- Starts with independent ideas from all participants, which leads to a high-quality final result.
- Shows respect for all participants and their ideas.
- Gives an opportunity for all participants to share by limiting high-verbal participants.
- Quickly collects many ideas, groups them, names each group, and then prioritizes the groups.
- Provides a shared visual and physical experience that engages all of the participants.
- Creates complete documentation of the participants’ ideas in their own words without anyone taking notes.
- Avoids conflict.
- Creates a shared understanding of the problems and/or solutions.
- Builds a strong sense of ownership of the final results.

Leaders can use the following steps to lead a structured brainstorming session with a team of people:

- **Prepare** – Define the main question, select participants, arrange for a room with some empty walls, and acquire materials (a marking pen and about 20 lined 4x4 Super-sticky Post-it Notes™ for each participant).
- **Kickoff** – Write the main question on an easel or whiteboard at the front of the room.
- **Generate** – Give participants 5-10 minutes to silently respond to the main question by writing one idea per note. Instruct them to print no more than 2-3 words on each note in very large font so others can read it from across the room. Create an example and put it on the wall. Have participants put their pens down when they are finished. Move to the next step when most pens are down.
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- **Follow-up** – Conduct additional structured brainstorming sessions to create solutions, implementation plans, and/or risk mitigation plans. Delegate tasks and then hold people accountable.

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